



<http://dx.doi.org/10.11646/zootaxa.3664.4.5>

<http://zoobank.org/urn:lsid:zoobank.org:pub:DB0A5FA8-4C46-4850-BE4A-3861FEA8FD5A>

## Cryptic speciation within *Asthenodipsas vertebralis* (Boulenger, 1900) (Squamata: Pareatidae), the description of a new species from Peninsular Malaysia, and the resurrection of *A. tropidonotus* (Lidth de Jude, 1923) from Sumatra: an integrative taxonomic analysis

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### Abstract

A review of the taxonomic status of the Asian Slug Snake, *Asthenodipsas vertebralis* (Boulenger, 1900) based on an integrative taxonomic approach using molecular, morphological, color pattern, and ecological data indicate it is composed of three well supported monophyletic lineages: (1) Pulau Tioman and Fraser's Hill, Pahang and Bukit Larut, Perak; Peninsular Malaysia; (2) its sister lineage from Northern Sumatra; and (3) the remaining basal lineage from Peninsular Malaysia. Furthermore, we consider the high sequence divergence (6.3%–10.2%) between these lineages (especially in areas of sympatry) and discrete differences in their morphology, color pattern, and microhabitat preference as evidence they are not conspecific. As such, we resurrect the name *A. tropidonotus* (Lidth de Jude, 1923) for the Sumatra populations, restrict the name *A. vertebralis* to the populations from Pulau Tioman, Genting Highlands, Fraser's Hill, Gunung Benom, and Bukit Larut that contain terrestrial, banded adults; and consider *A. lasgalenensis* **sp. nov.** to be restricted to the populations from Fraser's Hill, Cameron Highlands, and Bukit Larut that contain arboreal, unbanded adults.

**Key words:** Malaysia, Bukit Larut, Fraser's Hill, Pulau Tioman, Cameron Highlands, Genting Highlands, Sumatra, *Asthenodipsas*, integrative taxonomy, new species, cryptic species

### Introduction

The family Pareatidae, Asian Slug Snakes, has had a turbulent taxonomic history (David & Vogel 1996; Iskandar & Colijn 2002; Rao & Yang 1972) with the most recent taxonomy (Grossmann & Tillack 2003; Guo *et al.* 2011) generally settling on the recognition of three genera; *Pareas* Wagler, *Aplopeltura* Duméril, and *Asthenodipsas* Peters given the likelihood that *Pareas* is paraphyletic (Guo *et al.* 2011). Grossmann & Tillack (2003) synonymized *P. tropidonotus* (Lidth de Jude) with *P. vertebralis* (Boulenger) and placed them both in the resurrected genus *Asthenodipsas* along with *A. laevis* (Boie) and *A. malaccanus*. *Asthenodipsas vertebralis* is a nocturnal, montane species with a fragmented distribution extending from central Peninsular Malaysia to Sumatra. Within Peninsular Malaysia, *A. vertebralis* is known only from the upper regions of Bukit Larut, Perak; Gunung Benom, Cameron Highlands, Fraser's Hill, (Grossmann & Tillack 2003); Pulau Tioman of the Seribu Archipelago (Grismer 2011; Grismer *et al.* 2006); and Genting Highlands, Pahang (Sly 1976; Fig. 1). This species is generally restricted to elevations above 980 m in hill dipterocarp and lower montane cloud forests (Boulenger